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22. A NOTE ON THE SETTLEMENT OF FOULING ORGANISMS ON FIBRE-GLASS BOATS

Copper and aluminium alloy sheathing of wooden boats below waterline are well known conventional method for protecting it against marine wood-borers and foulers, although it has been reported (Santhakumaran and Pillai 1976) that fouling organisms are capable of attachment to the toxic substratum provided even by Copper. Of late, fibre-glass has been used as a good constructional material for boat-building, because of its special qualities like toughness, rigidity, resistance to abrasion and marine borers and imperviousness to sea water. Although settling behaviour of fouling organisms on wooden materials as well as on various protective coatings has been studied by several workers, experimental work on the same on fibre-glass surface is very scanty. It has been observed that all the wooden panels, sheathed with fibre-glass, were free from the attack of marine borers, even after one year of continuous immersion at Cochin harbour, although they were covered by fouling organisms in the same way as any unsheathed controls (Balasubramanyan 1971). The only other available literature in India on the settlement of foulers on fibre-glass is that of Dehadrai *et al.* (1975), who gave an account of the incidence of foulers on fibre-glass-coated hull of a boat operated in an estuarine environment. The present note deals with the intense accumulation of barnacles on fibre-glass boats, belonging to the Central Institute of

Fisheries Education, Bombay, which were in operation in the Versova creek.

Of the two boats from which data were recorded, one, an 18 footer, was entirely constructed of fibre-glass. The other one, of 14 ft. size is a wooden boat, coated with 'Torpedo' marine antifouling paint and the bottom of which was sheathed at two places with fibre-glass mat, covering an area of about 4 sq. ft. each, using a polyster resin. The area to be covered was first scraped well till the wood is exposed and this surface was wetted with the activated resin over which a layer of fiber-glass mat was fixed and pressed with a hand brush. Over this, a second layer of mat was laid, spreading again with more quantity of resin. Finally, the area was covered with a finishing mat so as to give a smooth surface. The boats were in operation in the Versova creek for a period of only 9 months from September, 1974 to May, 1975. They were only sparingly used, for ferrying the fish catch, crew and other personnel from 'M. F. V. Harpodon', both in the morning and evening, and rest of the time they were anchored near main vessel. During the monsoon, they were removed to the C.I.F.E. Work-shop, offering a chance to study the fouling settlement on the hull of these boats.

The fouling intensity was very high. Surprisingly, among the foulers, only barnacles were noticed. Only *Balanus amphitrite* was observed and *Chthamalus withersi*, which is a very common species found settling in large numbers to the stems of living mangrove plants in this area was conspicuously absent on the hulls. Probably, the cementing mechanism of *Balanus*, with its well-formed calcareous basal plate is more efficient than that of *Chthamalus*, where the shell base is membraneous rendering it difficult to attach to the smooth fibre-glass surface. The intensity of the settlement on the fibre-glass boat and the fibre-glass mat surface is given in Table 1.

TABLE 1

NUMBER OF BARNACLES, PER SQUARE INCH, SETTLED ON FIBRE-GLASS BOAT AND FIBRE-GLASS MAT SHEATHED HULL.

Number of observations	Number of barnacles per sq. inch on Fibre-glass boat	Fibre-glass mat
1	25	33
2	24	28
3	19	27
4	18	26
5	18	26
6	16	25

From Table 1, it can be seen that the intensity of settlement is as high as 25 per sq. in. (average 20 per sq. in.) and 33 per sq. in. (average 27.5 per sq. in.) on the fiber-glass boat and fibre-glass sheathed part of the wooden boat. The sheathing has also been found damaged and peeled off at many places. The bottom of the wooden boat coated with antifouling paint harboured very few barnacles and only 7 to 12 could be counted per sq. ft. (average 10 per sq. ft.).

According to Crisp and Barnes (1954), barnacles show a special preference to grooves and concavities on a substratum — a behaviour termed as "rugophilic", and the cyprids explore the surface very extensively before settling, and attachment to plane and smooth surface occurs only when such grooves and concavities are crowded. But the heavy settlement on the smooth hull of fibre-glass boat indicates that this predominant group among the fouling communities is capable of firmly attaching even to such a substratum. It is also interesting to note that, while the settlement on the fibre-glass sheathing on the wooden boat is very high, the same on other parts of the same boat, coated with antifouling paint is extremely scanty. The reason is that sheathing has invariably provided a non-toxic surface, which has also become comparatively rough as a result of damage and peeling, facilitating settlement.

The above observation and the earlier reports indicate that, in spite of its effectiveness as a protective sustratum against marine wood-borers, boats, constructed of fibre-glass or wooden boats sheathed with fire-glass mat, are prone to heavy fouling. Therefore, such protective surfaces should be coated with a suitable marine antifouling paint to effectively check the fouling settlement. This is all the more important, as on boats and ships marine growth is a serious problem for their efficient and economic operation. It may be mentioned in this connection that from experiments it has been observed that even the smoothest hull of a ship with aluminium paint provided an extra resistance of 6%, and after 24, 30 and 58 days operation, the same was increased to 12%, 24% and 48% respectively, even when the fouling was light (B.S.R.A. experiment on the "Lucy Ashton", *Trans. Inst. Naval Arch., London,* Part I, 40 (1951); Part II, 350 (1950); Part IV, 525 (1955). Compared to this, the extra resistance offered by the extent of fouling noticed in the present case will be tremendous and warrants effective antifouling measures.

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